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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,484	01/15/2004	Kevin Curtis Griffin	ROC920030367US1	6194
30206	7590	04/17/2008	EXAMINER	
IBM CORPORATION ROCHESTER IP LAW DEPT. 917 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829			THOMAS, SHANE M	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/758,484	Applicant(s) GRIFFIN ET AL.	
	Examiner SHANE M. THOMAS	Art Unit 2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-32,34,36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-32,34,36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/8/2008 has been entered.

Response to Amendments

All previously outstanding objections and rejections to the Applicant's disclosure and claims not contained in this Action have been respectfully withdrawn by the Examiner hereto.

Applicant's amendment has overcome the previous art rejections. Upon further search, the Examiner has cited the prior art references of Ohran, Armangua, Yamagami, Zait, Kapoor, and Golds to teach the amended claims as discussed herein.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,2,6,8,10-15,17-19,22,23,25,27-32,34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992).

As per claim 1, Ohran teaches:

A method (figure 4) for updating data at a backup system that tracks updates made to a primary system (snapshots track changes made to a primary system over the course of time - see figure 2), **the method comprising:**

creating a first group (collection of all changes made to the primary system from T0 - T1 - see figure 2) **including a first plurality of update requests** (the Examiner is considering the collection of all updates that occur to the primary system from time T0 - T1 to be a "first plurality), **the first plurality of update requests in the first group having an order dependency relative to a second plurality of update requests in a second, subsequent group** (the plurality of update requests in the first group from time T0-T1 has an order dependency relative to a second group of updates from T1-T2 as shown in figure 2 - the first group of updates occurs logically before the second group of updates as the second group of updates occur subsequent to the first group)

Ohran does not specifically teach **the update requests in each of the first and second groups capable of being processed concurrently and without regard for order relative to one another**. In other words, the update requests are processed asynchronously. Armangua teaches that the updates to a primary system can be performed asynchronously during snapshot processing [17/6-28]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the snapshot system of Ohran with the asynchronous processing of snapshot updates to a backup system of Armangua in order to have quickly processed the updates as the asynchronous processing does not have to wait for receipt confirmation that a track has been written, thereby speeding up the snapshot process.

Thus, the combination of Ohran and Armangua further teach:

concurrently completing the first plurality of update requests of the first group (snapshot update processing for the first group could have been processed asynchronously according to figures 8A or 8B of Armangua); **and**

after concurrently completing the first plurality of update requests, concurrently completing the second plurality of update requests of the second group (it follows that after the first group of updates are completed that the second group of updates would be completed asynchronously as well when a second snapshot request is made at time T2 - figure 2 of Ohran).

As per claim 2, **wherein concurrently completing the second plurality of update requests of the second group includes creating a subsequent the second group** (Ohran teaches that a snapshot bitmap is created each time a snapshot is requested in order to track the subsequent changes made to the primary system [9/63 - 10/8]; therefore, the Examiner is

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considering the process of concurrently completing a group to be the creation of the group - such as when the snapshot bitmap 52 is copied to the backup map [10/9-31]).

As per claims 6 and 22, **wherein creating the first group further includes updating a status indicative of whether the first group is active** (when the snapshot bitmap contains any data, the Examiner is considering such a situation to designate the current group being "active" as the setting of a bit in the bitmap would indicate the presence of a new update - [9/63 - 10/8]).

As per claims 8 and 25, Ohran teaches **wherein concurrently completing the first plurality of update requests further includes issuing an update request of the first plurality of update requests** (update requests are issued to the backup system in order to persistently store the updated data - [10/32-44]).

As per claims 10, 15, and 27, Ohran teaches **wherein concurrently completing the first plurality of update requests further includes holding an update request from the second plurality of update requests that is received prior to completing the first plurality of update requests the subsequent update requests** (as shown in figure 2 of Ohran, the grayed region indicates that all updates to the original data must be held while designated data blocks that correspond to the previous group of update's requests are persisted with the previous snapshot data).

As per claims 11 and 28, Ohran teaches **wherein concurrently completing the second plurality of update requests subsequent update request further includes releasing a hold on the subsequent held update request from the second plurality of update requests** (after the

blocks corresponding to the previous group of update requests are persisted to snapshot storage, the system tracks changes to original data as shown in element 34 of figure 2 of Ohran).

As per claims 12 and 13, **wherein creating the first group, concurrently completing the first plurality of update requests and concurrently completing the second plurality of update requests subsequent update request further comprises creating the first group, completing the first plurality of update requests and completing the second plurality of update requests subsequent update request on a the primary system** (occurring when original data is overwritten - [9/63 - 10-8]) **and backup system** (when a snapshot occurs, original data is sent to the snapshot storage - figure 1, 16).

As per claim 14, **modified** Ohran teaches:

A method for updating data at a backup system that tracks updates made to a primary system, the method comprising:

synchronously processing a plurality of groups of update requests, the plurality of groups having an order dependency relative to one another, with the update requests in each group being capable of being processed concurrently and without regard for order relative to one another; and

asynchronously processing the update requests in each group.

The rejection follows the rejection for claim 1 above. Figure 2 of Ohran shows that the groups of updates are processed synchronously (according to a time when the updates are received), and Armangua teaches that the updates of each group can be performed asynchronously during snapshot processing [17/6-28].

As per claim 17, Ohran teaches:

An apparatus [figure 6] comprising:

a processor [6/6-8]; and

recordable type media encoded with program code communicating with the processor [4/46-67] and configured to update data at a backup system that tracks updates made to a primary system by initiating creation of a first group including a first plurality of update requests, the first plurality of update requests in the first group having an order dependency relative to a second plurality of update requests in a second, subsequent group, with the update requests in each of the first and second groups capable of being processed concurrently and without regard for order relative to one another;

concurrently initiating completion of the first plurality of update requests of the first group; and

after concurrently initiating the completion of the first plurality of update requests, concurrently initiating completion of the second plurality of update requests of the second group.

The rejection follows the rejection for claim 1 above.

As per claim 18, **wherein the recordable type media encoded with the program code resides on at least one of a backup system and a primary system** (computer system 12 {primary system} may store the media - [4/46-67]), **and the backup system is peripheral from the primary system** (Armangua shows the separation of the primary 41 and backup systems 43 in figure 2, and Ohran shows in figure 1 a primary system 12 and 20 can be separate from backup system 22).

As per claim 19, **wherein the recordable type media encoded with the program code initiates creating a subsequent the second group** (a second group is created as shown in figure 2 at time T1 - when a snapshot is to be created, the previous updates to the primary system are recorded as discussed above).

As per claim 23, Ohran teaches **further comprising a memory 20 (figure 1) accessible to the recordable type media encoded with the program code.**

As per claims 29 and 30, **wherein the recordable type media encoded with the program code resides on the backup system or the primary system** (computer system 12 {primary system} may store the media - [4/46-67]).

As per claim 31, the rejection follows the rejection for claims 14 and 17 set forth above.

As per claim 32, the rejection follows the rejection for claims 1 set forth above.

As per claim 34, the rejections follows the rejection for claim 14 set forth above.

As per claim 36, Ohran further teaches **after completing the first plurality of update requests, arranging the second plurality of update requests of the group according to the order dependency** (figure 2). As the order dependency only relates to the order of the groups of the requests, not specifically the requests contained in each group (see claim 1), Ohran, by default, teaches arranging the second group of requests (e.g. updates occurring to the original data from time T1-T2) as all of the second group of requests are arranged by order dependency to be processed after the first plurality of requests as shown in the timeline of figure 2.

Claims 3,20, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Yamagami (U.S. Patent Application Publication No. 2004/0268067).

As per claims 3 and 20, modified Ohran does not specifically teach **wherein creating the first group further includes creating a group that includes a plurality of requests initiated at a plurality of applications.**

Yamagami teaches in ¶27 that one or more applications 112 are executing on the host that cause data to be modified. Claim 18 of Yamagami teaches that snapshot processing occurs to the data store whose contents are written with the requests from the applications executing on the host. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the modified snapshot system of Ohran with the teachings of applications creating the write requests on the primary system of Yamagami. Such a modification would have produced the predictable result of persisting all of the original data that was being overwritten by a plurality of applications on a primary volume to thereby backup the original data.

As per claim 37, modified Ohran teaches **wherein each update request is generated by an application from among a plurality of applications, and wherein the first group includes a first update request generated by a first application among the plurality of applications, the method further comprising creating the second group in response to the first application generating a second update request.** This could be seen as all application writes by each application are maintained by snapshot processing (Yamagami). It would have been seen by one having ordinary skill in the art that one of the applications could have generated a

first update request during time T0-T1 of figure 2 of Ohran as well as the generation of the second group of updates to begin when a write request is received after time T1 by the same application.

Claims 4 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Zait (U.S. Patent Application Publication No.2004/0210563).

As per claim 4 and 21, modified Ohran does not specifically teach **wherein creating the first group further includes updating a count associated with a number of the first plurality of update requests**. Zait teaches in ¶29 and ¶33 that the number of disk writes (e.g. “a count associated with the update requests”) performed during a snapshot period can be tracked and included with snapshot information. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the snapshot system of modified Ohran with the teaching of including a count with the snapshot data in order to have produced the predictable result of storing snapshot information/metadata along with the snapshot data itself.

Claims 7,16, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Kapoor et al. (U.S. Patent Application Publication No. 2005/0021565).

As per claims 7, 16, and 24, modified Ohran does not specifically teach **wherein creating the first group further includes assigning a group number to an each update**

request of the first plurality of update requests. Kapoor teaches ¶43 that is common to assign each snapshot a unique version number. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the modified snapshot system of Ohran with the teaching of snapshot version number sequencing of Kapoor in order to have produced the predictable result of assigning a sequence number to each snapshot taken by the system of modified Ohran. Such a modification would have associated a unique number to each snapshot data set taken of Ohran in order to easily discern older snapshots from newer snapshots or just be able to uniquely identify each snapshot data set.

Claims 9 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Golds et al. (U.S. Patent No. 6,647,473).

As per claims 9 and 26, modified Ohran does not specifically teach **wherein creating the first group further includes reading a group number from an update request of the plurality of update requests.** Golds teaches that update requests (flush and hold messages which cause updated data to be flushed from a cache and stored to a primary volume) may be associated with a unique snapshot group number (GUID) - [6/36-51]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the modified snapshot system of Ohran with the teaching of using a group number from an update request when processing a system snapshot. Such a modification would have produced the predictable result of snapshot coordination between the update requests and the snapshot request.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE M. THOMAS whose telephone number is (571) 272-4188. The examiner can normally be reached M-F 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt M. Kim can be reached at (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shane M. Thomas/

14 April 2008

Shane M. Thomas
Patent Examiner